

AeroShell



AEROSHELL GREASE 33

- Over 15 years of industry-leading performance
- Factory-fill for Boeing and Airbus A380 aircraft

Shell Aviation

In recent years, newly launched products have claimed to match the performance of AeroShell Grease 33. However, industry-standard laboratory tests demonstrate that AeroShell Grease 33 remains the product to beat. Its performance is also proven where it counts – in the air!

DESIGNED TO MEET CUSTOMER CHALLENGES

In 1995, Boeing challenged 20 grease manufacturers to formulate a product to meet its step-change specification: BMS 3-33. The new grease had to

- make operation easier by being suitable for multiple applications and thereby simplifying inventories and helping to prevent product misapplication
- extend lubrication intervals and reduce costs by offering improved corrosion and wear protection.

AeroShell Grease 33 was the only product to meet Boeing's requirements. It satisfied all the requirements and could be used in all but 9 of the 359 grease application points on a Boeing 737.

STILL SETTING THE STANDARD

There are greases with similar performance claims, but AeroShell Grease 33 remains the product of choice for those people looking for a high-quality product. It outperforms its rivals in various industry-standard tests and is a factory-fill grease for Boeing aircraft and the Airbus A380. Other key airframe manufacturers, including Embraer, Bombardier, Fokker and BAE Systems, also approve and use it. No grease in its class can match the in-the-air experience AeroShell Grease 33 has acquired during more than 15 years of service.

AEROSHELL GREASE 33 IS A FACTORY-FILL GREASE FOR BOEING AIRCRAFT AND THE AIRBUS A380, AND IS USED BY MOST FIXED BASE OPERATORS OWING TO ITS HIGH PERFORMANCE.



A SUCCESSFUL FORMULA

AeroShell Grease 33 is a combination of

- a lithium complex soap thickener for excellent mechanical stability, water resistance, temperature range and additive compatibility
- a robust and complex performance-enhancing additive system
- a carefully designed blend of polyalphaolefin (PAO) and ester base oils.

Some greases contain only PAO base oil. However, a carefully balanced combination of PAO and ester base oils gives improved solvent properties, which enables a wider choice of performance-enhancing additives to be used. Ester base oil also produces the swelling necessary in seal materials for good seal integrity, and has extremely good high- and low-temperature performance.

PROVEN PERFORMANCE AGAINST THE COMPETITION

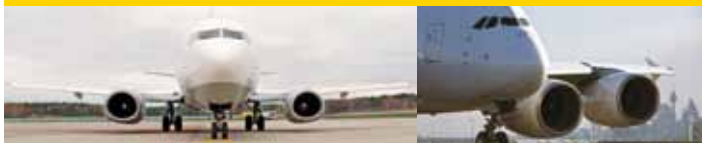
AeroShell Grease 33 delivers extended component life and lower maintenance costs.

Preventing corrosion can mean reduced maintenance costs through longer component life. In the modified ASTM D1743 test, lightly loaded greased bearings are rotated, submerged in a 3% salt solution and then stored at 52°C and 100% humidity for 12 hours. No corrosion was observed with AeroShell Grease 33, whereas a bearing with a competitor's MIL-PRF-81322F-specification grease showed corrosion between the rollers and the race.

Extreme-pressure wear protection can mean extended component life and lower maintenance costs. In industry-standard test ASTM D2509, a cup rotates at 800 rpm on a block under an 18-kg load for 10 min while being continuously fed with fresh grease. A smaller wear scar was measured when using AeroShell Grease 33 compared with a competitor's MIL-PRF-81322F-specification grease.

Mechanical stability is important, as grease needs to stay where you put it. Mechanical stability is measured using an industry-standard penetration test before and after repeatedly working the grease to see whether it has become too soft or too hard with use. The grease is either squeezed through holes in a plate over 100,000 double strokes (extended ASTM D217 test) or sheared over 50 h at 80 and 100°C by turning a tube containing a heavy solid roller (ASTM D1843 test). The first test is repeated with 10% water. AeroShell Grease 33 shows less penetration change in both tests compared with other greases tested.

Oil separation is the tendency of the base oil to separate from the thickener. Slow controlled separation provides lubrication, but excessive separation may leave the grease too hard to provide adequate protection. In industry-standard test ASTM D6184, which runs for 30 h at 100°C, AeroShell Grease 33 had 3.4 wt% separation, which is well within the maximum 5 wt% in the MIL-PRF-23827C specification and better than the competitor greases that we tested.



PROVEN PERFORMANCE IN THE AIR

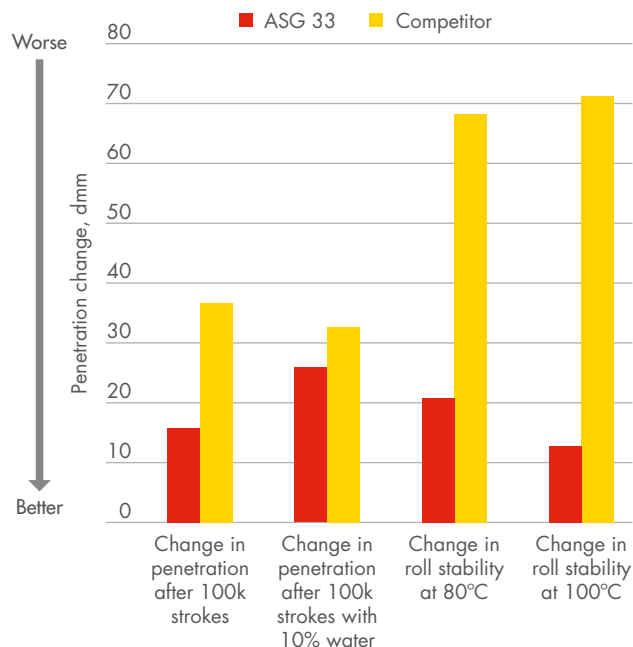
AeroShell Grease 33 was the first and is still the only grease to meet Boeing's BMS 3-33A specification and is approved to its BMS 3-33B specification. It can be used for virtually all grease points currently using greases with MIL-PRF-23827C, MIL-G-21164D¹, BMS 3-24, MIL-PRF-81322F², SAE AMS 3052 and AIMS09-06-002 specifications.

AeroShell Grease 33 is approved by all leading airframe manufacturers and is a factory-fill product for Boeing aircraft and the Airbus A380. **Many competitor greases do not meet the MIL-PRF-23827C specification.**

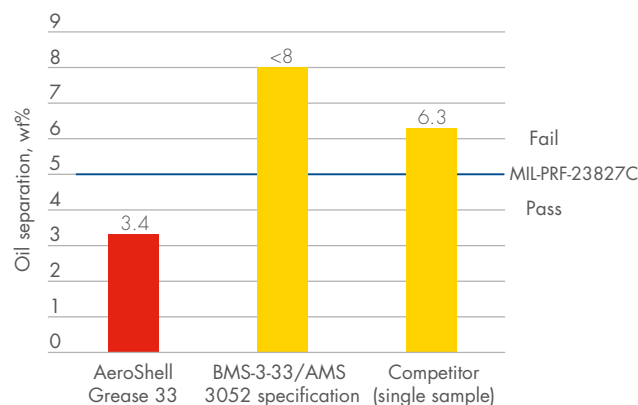
Thanks to its outstanding performance, factory-fill status and over 15 years' in-the-air service, AeroShell Grease 33 has logged millions of hours of flying time.

Why would you settle for anything else?

¹Where optional to MIL-PRF-23827C
²Except in wheel-bearing applications



SUPERIOR MECHANICAL STABILITY. AeroShell Grease 33 has better mechanical stability than a competitor's grease in the extended ASTM D217 and D1843 tests, so you can be confident that it will stay where you need it.



SLOW, CONTROLLED OIL SEPARATION. AeroShell Grease 33 has better oil separation properties than the competitors' greases tested (ASTM D6184) for better long-life lubrication and grease condition.

LOOK OUT FOR MISLEADING CLAIMS FROM NON-STANDARD TESTS!

AeroShell Grease 33 outperforms its competition in certain standard tests: those developed to replicate aircraft operating conditions. Some competitors use non-standard tests in an attempt to demonstrate performance weaknesses in our products. **Trust only the standard tests.**

For example, claims that a colour change is the result of the hydrolysis of esters arise from a test that stores samples at 121°C with 10% water for 7 days. A colour change is a normal and superficial response to high temperatures, and the performance of AeroShell Grease 33 is unaffected by the change in appearance. As for hydrolysis, this is highly unlikely, as any water would quickly evaporate and no acids (a hydrolysis product) were found when we replicated the tests. Moreover, storage at 121°C for 7 days is not a realistic operating condition, which is why this test is not adopted as an industry standard!